National Institute of Environmental Health Sciences

Evaluation of post-Katrina flooded soils for contaminants and toxicity to the soil invertebrates Eisenia fetida and Caenorhabditis elegans

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Abstract:

This research evaluated soil samples from a New Orleans neighborhood in the Chalmette, Saint Bernard Parish, that had been inundated by flooding associated with Hurricane Katrina. The goal was to determine if ecological risks persisted from flood waters that had come in contact with hazardous surface chemicals before inundating this low-lying neighborhood for a prolonged period. Research objectives were to establish the presence or absence of volatile organic and heavy metal contaminants, and then asses the toxicity of this soil to Eisenia fetida in a soil exposure assay and Caenorhabditis elegans in a simulated porewater exposure assay. Soil analysis revealed detectable levels of metals and organics in the surface soil at each location. No contaminant was detected in concentrations above human health screening values. Chromium and mercury were detected at levels in excess of typical ecological risk values. Soil extracts revealed concentrations of nitrate, sulfate, and chloride above those from an unflooded background sample. Toxicity testing resulted in no acute effects to either test species, but did show bioaccumulation of arsenic, cadmium, and lead in E. fetida exposed to several samples. The combination of mercury and sulfate provide the potential for mercury methylation should flooding and prolonged inundation occur again.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Extreme Weather Event, Other Exposure

Extreme Weather Event: Flooding, Hurricanes/Cyclones

Geographic Feature:

resource focuses on specific type of geography

Ocean/Coastal, Urban

Geographic Location:

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

General Health Impact

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content